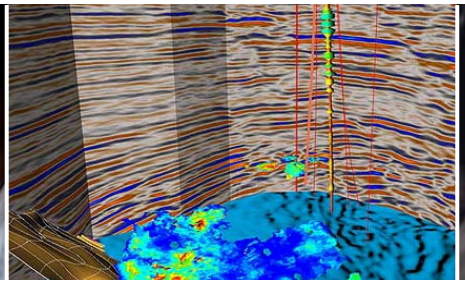
ChevronTexaco


Leading Commercial Gasification and Power into the New World of Geologic Sequestration of CO2

Presented by James C. Houck

President, Worldwide Power & Gasification

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Alexandria, VA

ChevronTexaco

- One of the world's largest integrated energy companies.
- >$100 billion in sales.
- 53,000 employees.
- Operations in 180 countries.
- Global market leader in gasification.

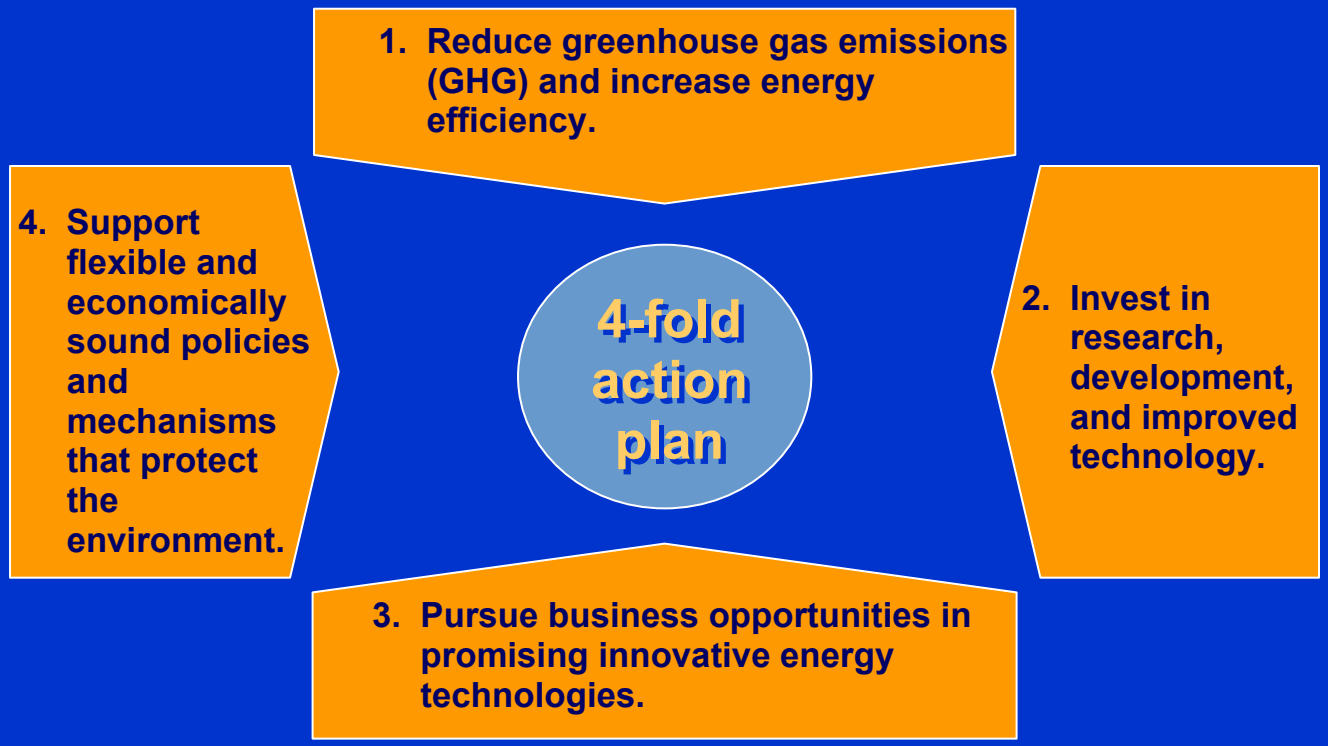
ChevronTexaco Climate Change Position and Plan

Position

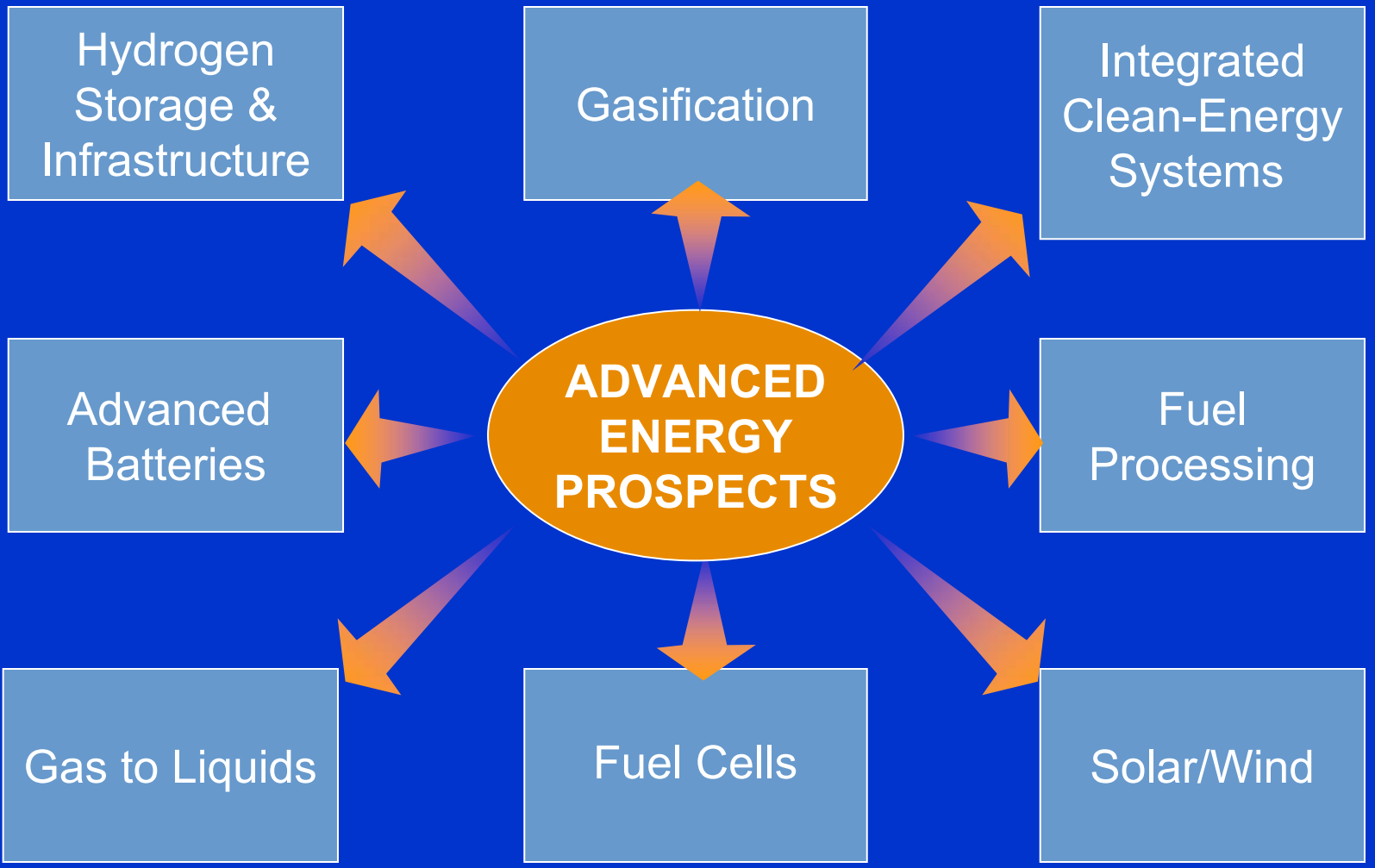
We at ChevronTexaco are responding to increasing climate change concerns by integrating an action-based approach into our business strategy.

Plan

4-Fold Plan predicated on *ACTION*, not rhetoric.



Invest in Research Development and Improved Technology



ChevronTexaco

ChevronTexaco
Worldwide Power & Gasification

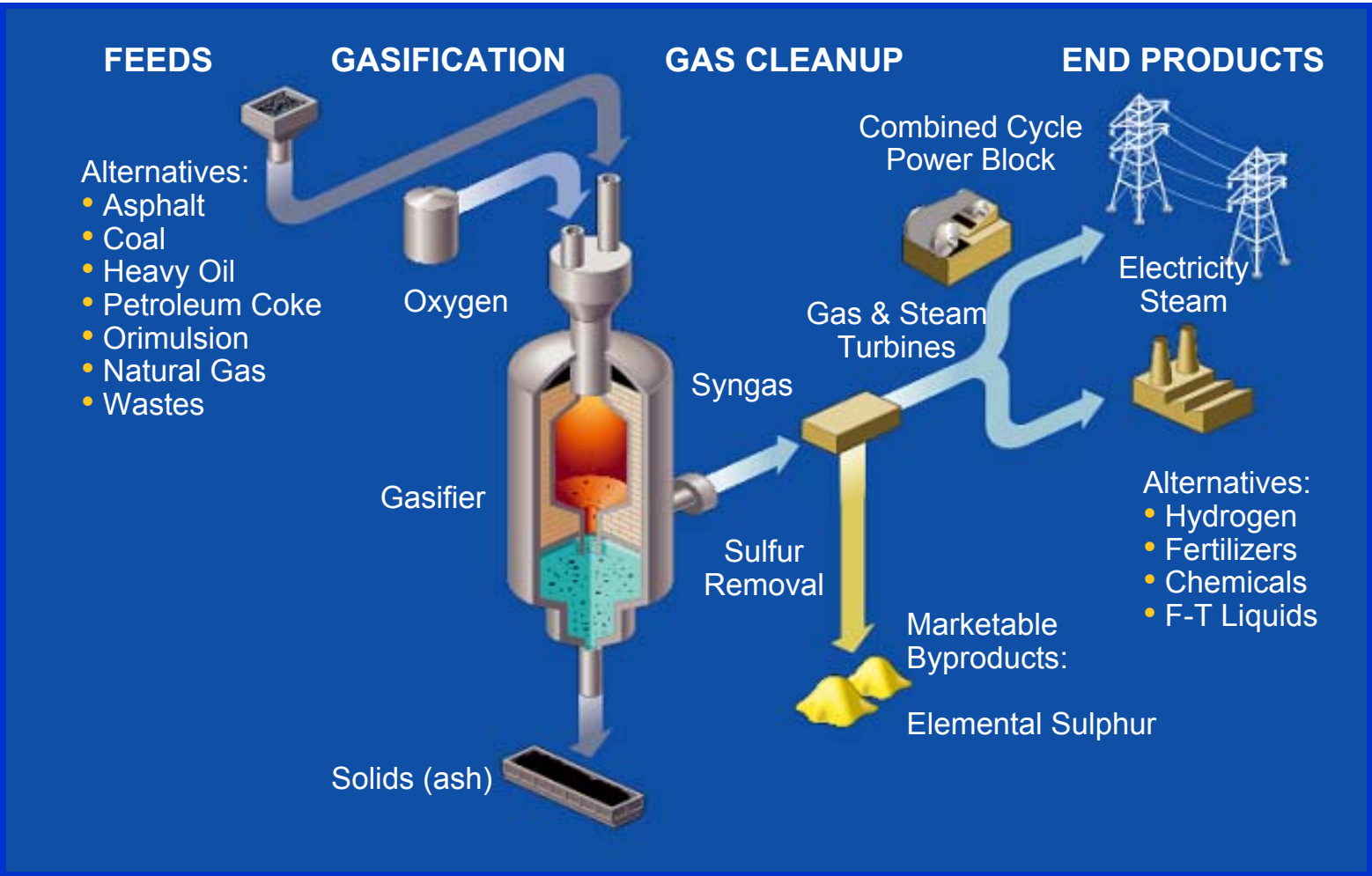
- A business unit within ChevronTexaco.
- 130 plants licensed in last 52 years.
- Both a process licensor and project owner.
- First oil gasification plant in 1956.
- First coal gasification plant in 1978.
- 72 commercial gasification plants now operating, under construction, or in advanced development.
- Nominal synthesis gas capacity: 5.1 billion standard cubic feet/day.

Texaco Gasification Process

Gasification is . . .

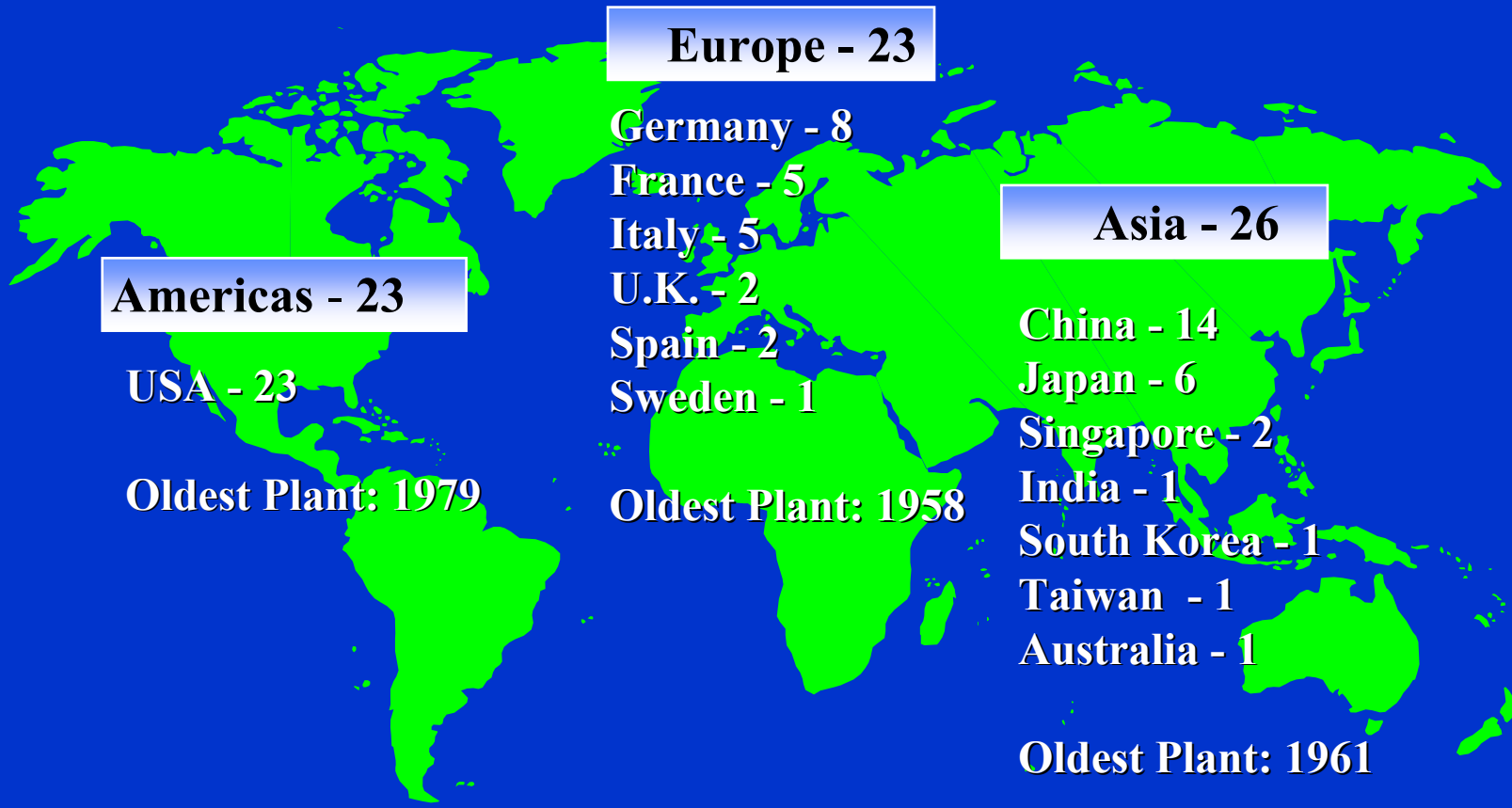
. . .a commercially proven partial oxidation process that produces mixtures of Hydrogen and Carbon Monoxide (synthesis gas or syngas) from a variety of hydrocarbon containing materials. Syngas can then be used for chemical production or power generation.

IGCC: Texaco Gasification Power Systems



ChevronTexaco Gasification Process

72 Facilities: Operating (66), Construction / Engineering (6)
125 Gasifiers: Operating (113), Construction/Engineering (12)
5.1 Billion Standard Cubic Feet/Day Syngas (H2/CO) Nominal Capacity



CO2 Capture Options

- Post-Combustion Capture

  Feedstock → Power → CO2 + NOx

  Low pressure

- Oxyfuel Capture

  Feedstock + Pure O2 → Power → CO2

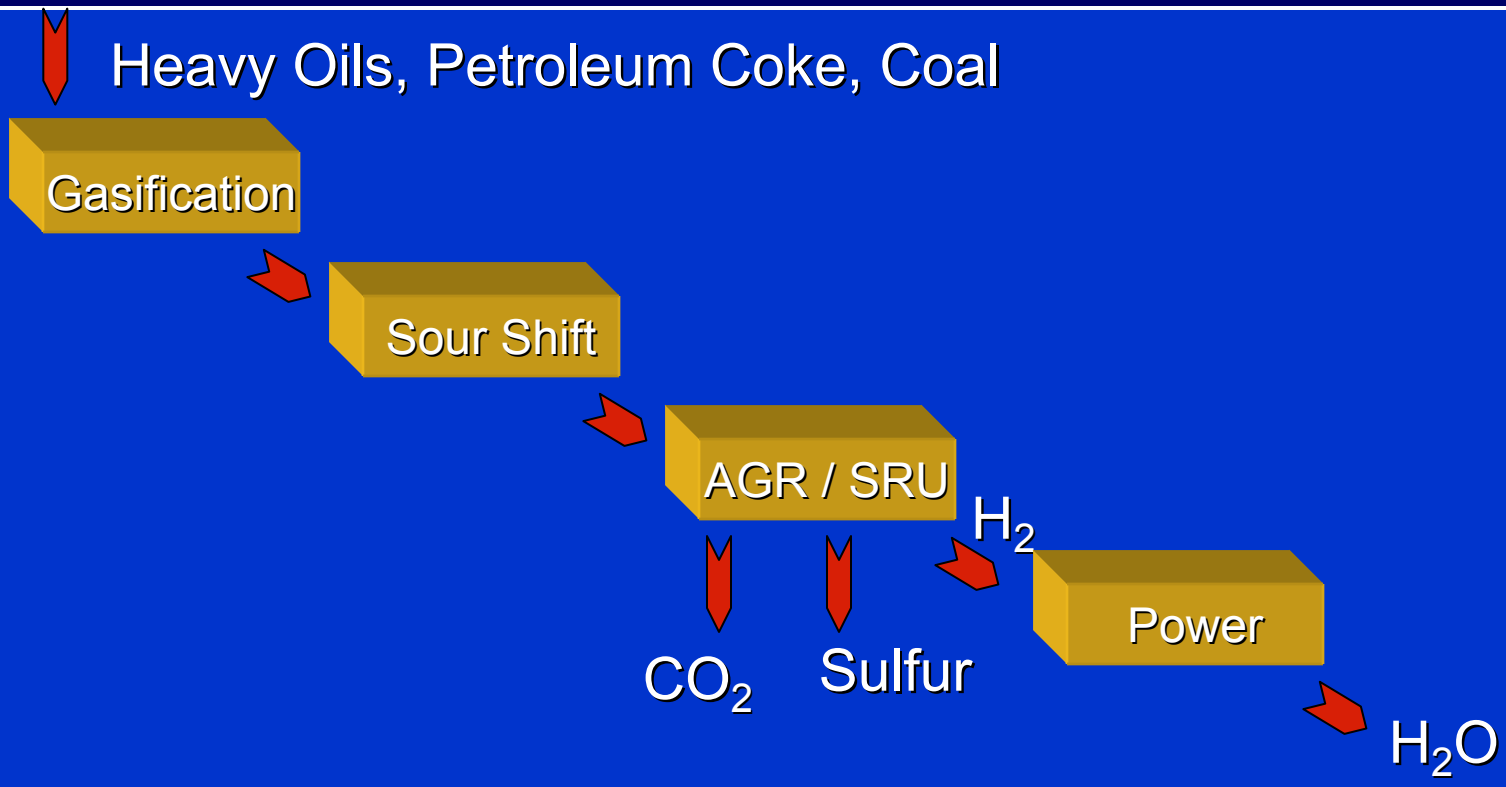
  Low pressure

- IGCC Pre-Combustion Capture

  Feedstock → Gasification → CO2 (High pressure)

  Gasification → H2 → Power

IGCC CO2 Separation & Capture



Water Gas Shift Reaction

$CO + H2O \rightarrow CO2 + H2$

IGCC and the ChevronTexaco R&D Portfolio

- Advantages of IGCC from a geologic storage perspective:
  - Relatively pure CO2.
  - Lower cost to capture than post-combustion.
  - Much higher capture pressures than post-combustion capture.

IGCC and the ChevronTexaco Greenhouse Gas R&D Portfolio

- Founding member of CO2 Capture Project:
  - $24 million USD over 3.5 years.
  - Team lead for the Storage, Monitoring & Verification Team.
  - Team lead for the Policy & Incentives Team.
- Weyburn Field JIP:
  - Monitoring & verification R&D at large EOR/CO2 expansion.
- GEODISC JIP:
  - Working to resolve subsurface R&D challenges.
- GEO-SEQ (LBNL) field demonstrations:
  - Conducted work at CVX-provided Lost Hills, CA.
  - Pending work at CVX-offered Vacuum Field, NM.

IGCC Permits Staging of Cost Effective CO2 Capture Implementation

- Uses same basic IGCC configuration with or without CO2 capture.
- Cost of additional equipment for CO2 capture (when/if needed at later date) is significantly less than for a pulverized coal plant.
- Employs commercially proven technology for CO2 removal (already being used in chemical and petroleum industries).

Environmental Performance – Air Comparison with Supercritical PC Plants

	lb/MWh		lb/MMBtu		ppmv	
	IGCC	PC	IGCC	PC	IGCC	PC
SOx [1]	0.47	1.19 [3]	0.053	0.132	13	57
NOx [2]	0.50	0.72 [3]	0.057	0.08	15	48
CO	0.32	0.99	0.036	0.11	25	n/a
PM	0.06	0.16	0.007	0.018	n/a	n/a
VOC	0.01	0.04	0.001	0.004	1.4	n/a

1. Comparison assumes Eastern Bituminous Coal with 2.2 wt% sulfur
2. For IGCC, NOx is corrected to 15% O_2; For PC, NOx is corrected to 6 % O_2
3. PC Plant requires SCR and wet FGD to accomplish above emissions for NOx and SOx.

Benefits of ChevronTexaco IGCC

- Energy security – utilizes coal.
- Versatile technology – produces multiple products.
- CO2 capture from IGCC already proven.
- Energy security – utilizes coal.
- 11 plants using ChevronTexaco gasification technology currently capturing CO2 pre-combustion.
- CO2 capture from IGCC significantly cheaper than post-combustion capture.

ChevronTexaco Gasification is a Step Towards the Future.

- IGCC is a link to the future.
- Its many benefits have made IGCC a critical component of FutureGen.
- FutureGen is a public-private partnership.
- One of ChevronTexaco's fundamental values is being a good partner.
- As the market leader in gasification, ChevronTexaco's IGCC technology can provide that important link to the future.